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I.

ANNUAL ADDRESS.

BY CHIEF-JUSTICE CHARLES P. DALY, President.

SUBJECT: THE GEOGRAPHICAL WORK OF THE
WORLD IN 1874.

PHYSICAL PHENOMENA OF THE YEAR.

The physical occurrences or phenomena of the past year have been atmospheric disturbances, such as typhoons, cyclones and hurricanes, unexampled for many years in their violence and destructive effects. Great rain-falls in certain parts of the earth followed by enormous and damaging floods. The falling in certain localities of unprecedented masses of snow. Extreme cold during the past and present winter, and earthquakes and volcanic disturbances considerably distributed, but with one exception, not as violent in their character, nor as injurious in their effects, as the like phenomena in the past few years. Of these I may mention the great typhoon which on the night and morning of the 22d and 23d of September last, swept over Hong Kong, involving the loss of more than eight thousand lives and the destruction of a vast amount of property. The cyclone in November which passed over this country from the Gulf states to the Lakes and along the Atlantic coast from Virginia to Nova Scotia, destroying half of the town of Tuscumbia in Alabama. The storms along the New England coast in May. The storms, tornadoes, and extraordinary rain-falls throughout the southern and middle states in June and July, attended by the great floods at Pittsburg and Alleghany city, by which two hundred lives were lost, and by the tornadoes which destroyed the town of Tampico in Illinois, and produced the loss of life and property in the valley of the Juniata. The hurricane in Jamaica. The disastrous storm on the coast of Nova

Scotia and the terrific gales on the coast of Great Britain and Scotland. The damage done by the rise of the Thames in March, and the destruction of plantations in April, by the rise and overflow of the Mississippi. Destructive floods in India, in August, and in the same month the great flood at Lorida in Spain which swept away two hundred habitations. The immense snow-fall in Persia, which extended over the whole country, accompanied by a winter of extraordinary severity, succeeded by a spring and summer when the rain-fall reached the unparalleled height of twelve inches, the height before seldom exceeding two inches; which was followed by the overflow of the Tigris, and the great flood in Bagdad in which many persons were drowned, and by the floods that destroyed one-third of Shiraz and injured other towns.

The great severity of the winter of 1874 and 1875, in the whole of northern Asia. The falling of great masses of snow during the present winter in the Alps, the Pyrenees and in Spain. The unusual number of icebergs seen in the Atlantic. The hail storm in Southern France, extending over two hundred miles, with a breadth of two miles, which was of great severity and caused much injury, the hail stones being as big as marbles.

A slight eruption of Mount Etna, a continuation of the eruption of Manua Loa in Hawaii, the destruction by an earthquake of Antigua and some smaller towns in Guatemala, and shocks or disturbances from earthquake in Vera Cruz, St. Thomas, Equador, Porto Rico, Mexico, Utah, North Carolina, Scotland, Innspruck, Smyrna, Constantinople and Ceylon.

The great typhoon at Hong Kong is the most striking of these events. It was remarkable for its violence, its rapidity and its destructiveness. Hong Kong during the past fifteen years has been visited by five most disastrous typhoons, but they all sink into insignificance before the fury of this one, which moved at the rate of forty miles an hour, being double that of the West India hurricanes. The destruction of human life was so rapid and enormous that no approximate estimate could be made, and it has been put down by some even as high as thirty thousand. Every ship in the harbor was injured. One hundred junks foundered almost at the same time, and the destruction of property, which is estimated at more than five millions of dollars, was so great, that the city, when the typhoon was over, looked like a town that had been long and heavily bombarded, in every direction.

The great rain-fall in Persia is also remarkable, for Persia has been, for the last few centuries, a country that was constantly becom-

ing more arid; where the supply of water was annually diminishing, and where the continuation of extensive works for its preservation and distribution by irrigation has long been going on as a matter of imperative necessity.

METEOROLOGY.

The knowledge which is now so readily and so quickly obtained of such occurrences over a wide portion of the earth's surface, as well as of their exact character, has given an increased impetus to and greatly advanced the science of Meteorology. Predictions of approaching atmospheric disturbances, or, as they are called, "weather predictions," by scientific men, have been verified in so many instances, that it may now be stated to be within the power of science to anticipate these occurrences and thereby, to a considerable extent, to guard against their effects. The belief is now becoming prevalent that they are connected with magnetic disturbances and with the changes that take place in the spots upon the sun, and much is anticipated from a closer study of terrestrial magnetism and from the discoveries that have recently been and are continuing to be made in solar physics.

This theory, that as the sun's spots enlarge, the rain increases over a wide area of the earth's surface, and that it diminishes over a like area as the sun's spots are reduced, has, during the past year, been strengthened by observations made at the Mauritius and by Mr. S. W. Dawson's observations that the fluctuation and change of level in our great northern lakes seems to correspond with the movement of the sun's spots.

The observations making and recorded in India have become of the greatest importance in the advancement of this science. From the great number of stations and the data collected, it will soon be possible to form a conception of the geographical distribution of pressure, temperature, rain, etc., over one-half of India and its seas. The discussions respecting the deficient rain-fall in the Presidency of Bombay, so disastrous by the great famine which followed it, has led to the announcement of a principle which, if confirmed by future observation, will make it possible to predict to some extent the nature of the Indian seasons.

THE EARTH.

The year has been distinguished by a very important event, the transit of Venus, the observations of which, though designed chiefly for astronomical purposes, are also of geographical interest, as they are made to ascertain the distance of the earth from the sun. All

the results are not yet known ; but the observations made are sufficient to show that the distance is less than was heretofore computed ; that it is about 92,000,000 of miles.

In respect to observations having relation to the earth generally, Mr. H. Howarth during the year has expressed the belief that the earth is slowly and gradually shrinking at the equator and correspondingly thrust out toward the poles, which he attributes to earthquakes and volcanic action, the chief seat of which disturbances lies within a belt bounded by the 20th parallel on either side of the equator, and Mr. H. V. Hind, of Nova Scotia, has called attention to the fact, that somewhere between longitudes 13° and 41° east of Greenwich, the major equational axis of the earth is now about two miles longer than the equational axis at right angles to it ; that at a former period it may have been greater, and to the effects that would follow if the bulge varies according to a regular law.

POPULATION OF THE WORLD.

An estimate of the population of the world was made during the year by Messrs. Behm and Wagner, who fix it at 1,391,030,000.

SCIENTIFIC VOYAGE OF THE CHALLENGER.

The Challenger, of whose scientific voyage of exploration around the world, I have previously given an account, has been, during the early part of the year, in the Antarctic circle, which she crossed last February, and after visiting and examining many islands, she has, during the residue of the year, been exploring in the Eastern Seas and the Malay Archipelago, with very satisfactory results. A correspondent from the ship in the London *Times* describes the bottom of these Eastern seas, from the sounding of the Challenger, as being a chain of sunken lakes or basins, cut off from the upper and neighboring water by their surrounding rims or borders, as lakes are upon the land. That the mass of water lying in them having thus no means of communicating with the upper and outer water above, remains of the same temperature, and that consequently the cold currents traveling from the Antarctic do not obtain admission, but pass over these lower basins or lakes. Indeed the more fully we explore the depths of the ocean and trace the configuration of the surface of the earth beneath the sea, we find that it has the same general features as it has upon the land, mountains, valleys, gorges, chasms, precipitous banks, and other irregularities, hid from our view by the waters that cover them, the nature, extent, form and variety of which, are revealed by the deep sea soundings now so extensively

carried out. These inequalities of surface of the ocean bottoms have more to do than has been hitherto suspected with the direction of ocean currents, as mountains and valleys have upon the land with the direction of the wind. As the facts accumulate from these deep sea soundings, we shall be enabled to map the bottom of the oceans as we have mapped the surface of the dry land, and the time will come when we shall give names to prominent places beneath the waters, that we may distinguish and refer to them as we now give names to the mountains, great valleys and lakes upon the land, or map out and distinguish by their names the inequalities upon the surface of the moon. Such is the progress of physical geography, Geography beneath the waters has but just begun.

THE SEA AND OCEAN CURRENTS.

Mr. J. Prestwick has collected and arranged tables of the temperatures of the sea in various depths, as observed from 1749 to 1868, by which he has arrived at some general conclusions, which in the main agree with Dr. Carpenter's, especially in respect to the flowing of a cold current along the ocean's bottom from the pole to the equator.

Dr. Carpenter is still earnestly advocating his theory of oceanic circulation which I explained on a former occasion. In an address last summer before the British Association at Belfast he stated that his theory had been anticipated by a Dr. Lenz of St. Petersburg as long ago as 1845, but that his own conclusion had been formed independently, without any knowledge of his predecessor's investigations. Dr. Carpenter finds that the result of the examination of the temperature of the ocean by the Challenger in her exploration along the length and breadth of the Atlantic confirms his theory that there is a constant flow of cold water from the polar regions to the equator, which, reducing the ocean level at the poles, causes an indraught of the warm surface water of the Atlantic to flow toward the poles from the equator, thus producing a horizontal circulation which completes itself and accounts for the Gulf Stream and other phenomena connected with the currents and the course of the trade winds.

Mr. Croll, the scientific antagonist of Dr. Carpenter, on the other hand maintains that all the movements of the waters of the ocean, the deep as well as the surface water, are produced by the action of the winds upon the surface in connection with the motion of the earth, and that the deep current that is now known to flow from the pole to the equator is the reflux of the current driven by the winds to the poles.

Captain Schilling of the Russian Navy has published his views

respecting ocean currents, and has come to the conclusion that none of the theories that have been advanced are consistent with the facts. He considers that both atmospheric and ocean currents are subject to general laws and disturbed by common causes, which he says are the variation in the weight of the water, and the atmosphere, the revolution of the earth upon its axis and the attraction of the sun and moon. He does not believe that the equatorial currents are produced by the trade winds, although they may increase the rapidity of the currents at the surface, and he thinks that those which flow parallel with the equator are due to the attraction of the sun and moon.

The charts of the winds and currents of the Pacific, Atlantic and Indian Oceans compiled by Captains Evans and Hall, and published during the year, are a most valuable acquisition, as they have been very carefully prepared, and show for the four seasons the pressure, winds, and temperature over the parts of the globe covered by the sea.

ANTARCTIC.

Mr. L. Martinet has during the year drawn attention to the region of the Antarctic Circle. He maintains that the general impression that the Southern Pole is the coldest is erroneous, and that certain experiments of Prof. Tyndall warrant the belief that a warmer temperature exists there. This, it may be remembered, was also claimed upon other grounds by the late Capt. Maury, in a communication addressed to this Society many years ago.

GEOGRAPHICAL WORK IN THE UNITED STATES.

Of the geographical work of the world during the year I shall begin with that of our own country. That most important work, the Coast Survey, has been continued. The Smithsonian Institute has during the last, as in every year, prosecuted those inquiries that are so valuable, and have given it as a national institution, its high character, and the Hydrographic office, together with its other general work, has continued the publications for the preservation and diffusion of knowledge respecting the ocean and its navigation which are so creditable to our government.

U. S. ENGINEER CORPS.

The labors of the Engineer Corps during the past year fill two bulky volumes, comprising the report of its distinguished chief, Gen. A. A. Humphreys. The geographical work embraces the improve-

ment of harbors and rivers, the survey of transportation routes to the sea board, the survey of the mouths of the Mississippi river with a view of obtaining a sufficient depth of water for the construction of a ship canal from the river to the Gulf of Mexico, or the deepening of its natural outlets to the Gulf, the present outlets being wholly insufficient to meet the wants of the increasing commerce of the West. Examinations for a permanent plan for the reclamation of the alluvial basin of the Mississippi river now subject to inundation; the continuation of the survey of the northern and north-western lakes; surveys for military maps; surveys for the irrigation of some of the great valleys in California; geological reconnoissances in parts of Western Nevada and adjacent California, and geographical explorations in the great west, by the various expeditions under Lieut. G. M. Wheeler, Major J. W. Barlow, Capt. W. A. Jones, Lieut. E. H. Ruffner and Capt. W. Ludlow.

These labors have extended over the whole country from the Atlantic to the Pacific oceans, and are so vast in their details as to preclude the possibility of my doing more than to refer to some of them, and even then only in the most general way.

LIEUT. WHEELER'S EXPLORATION.

Lieut. G. M. Wheeler's survey west of the 100th meridian has been a continuation of the same general labors that have been prosecuted in this survey since 1869, and which during the last year have covered an area of seventy-five thousand miles. Much of the work done has been topographical, with which, however, has been connected geology, mineralogy, natural history, and the gathering of facts bearing upon the industrial resources of the country. The geological labors extended over the "Colorado plateau" region, a large portion of which is drained by the Colorado and its tributaries, and which, from its step-like table lands, its gorges and canons, is of great interest to the geologist. The geographical labors have comprised a study of the erosion of running water, by which canons are produced, and contrasting it with the erosion by rain or by the drifting of sand, and a study of the origin of mountains and of volcanic phenomena. Lieut. Wheeler says that every State and Territory west of the plains is crowded with the products of volcanic action, ancient and modern. In southern Utah the connected beds of lava cover an area of five thousand square miles, and an area of the same character in Arizona and New Mexico spreads over twenty thousand square miles. The conclusions of the geologists of the expedition, from their observations, are that volcanic disturbances and eruptions in our western

territory will be again resumed and may occur at any day ; that they have occurred so recently, geologically speaking, that it is extraordinary that there is no human record of them. Another object has been the study of the glacial epoch in this part of our continent, and the southern limit of our ancient system of glaciers has been ascertained through the entire extent, in longitude, of the survey. Large collections have been made in mineralogy, paleontology and geology. The collections in natural history have been unusually extensive ; the results, especially in botany, it is said, have never probably been exceeded by any exploring or surveying expedition in the west.

A writer in the *New York Times*, attached to the expedition, has given an account of interesting portions of the country in the vicinity of the canons, and of the remains of the habitations of the races that formerly peopled it, and of interviews had with the Ute and Pueblo Indians. He describes a country in his northward route from Carrizeto canon as a wonderful country, from the great beauty of its wooded hills, its reedy lakes, and rills of pure cold water ; and another region through which the river Chama flows, of the average altitude of 9,000 feet, which he describes as a garden spot, the finest, most attractive, and romantic he ever saw ;—its numerous valleys, covered with the finest grass and penetrated by swift creeks, filled with trout, and embraced by gently-sloping, well timbered hills, with here and there a high peak. He also observed that the temperature of the springs and creeks was from ten to twelve degrees higher than other plateaus of equal altitude, and makes the pertinent remark that now that we have begun to investigate the temperature of the ocean at certain depths, it would be as well also to study that of the waters at different heights. The Ute Indians were opposed to any exploration of their country, as they did not want the white man to settle on their lands, and scare away the game. He was present at an interview with them, and describes the dandy of the tribe, who strutted about that he might be sufficiently admired, and the sub-chief, who was a cynic, with a thin, pock-marked face, and a solitary eye, so small, black, and penetrating as to be absolutely fascinating. When spoken to upon the subject of religion, he said he knew nothing about God ; that he did not believe that there was any one greater than the Great Father, the President, at Washington. With a keen, sardonic look, and a twinkle of his one eye, he said that the Mexicans and the Americans had water put upon their heads (baptism), but it seemed to him that it did them no good, and it was of no use to an Indian. He remarked that the Utes did not worship any thing, but that they deferred to the sun, and asked the explorers if they had

ever heard of Montezuma. The writer examined several of the remaining dwellings of the race that formerly occupied the country, by some supposed to have been the Aztecs. They are generally down on the sides of the canons, or on rocky elevations or projecting ledges, or like places of security. They are square stone buildings, with walls of about twelve inches thick, cemented by adobe clay, two stories high, with four rooms, having square holes cut through the partition walls, large enough for a person to pass by, stooping very low. These buildings have no place for entrance upon the first story, and are accessible only by a ladder. They are so placed as to command the view both up and down the canon, and to be in view, also, of each other, that warning might be given by smoke or other signals upon the approach of enemies, being, in fact, a chain of signal stations throughout the canons, the larger ones serving as centers of strength or garrisons from which the smaller ones might be reinforced — the arrangement of a pastoral and semi-civilized people for protection against the fierce, war-like tribes that surround them on the east and west. The mesas on the top at a former time afforded pasturage for the flocks of a numerous people, now reduced to a mere remnant by war and other causes, chief among which has been the gradual failure of a supply of water.

The Pueblo Indians were visited, but they have frequently been described by other explorers. They have intermixed by marriage with the Utes, Navajos and Apaches, but still retain their severe laws against dishonesty and immorality, as well as their ancient religious faith; and every morning and evening go up to the house-top, and chant to the sun a mournful, musical song in the minor key, and apparently in monosyllabic words. Dr. Yarrow listened to it day after day with delight, but was unable to get it.

MAJOR BARLOW'S EXPEDITION.

Major Barlow's labors have been in the military division of the Missouri and have embraced surveys for military and geographical purposes, astronomical observations; the determination of the latitude and longitude of places in Dakota, and the completion of maps embracing the Yellowstone river, Eastern Mexico and a part of Texas and the continuation of the New Map of the Western Territories.

LIEUTENANT RUFFNER'S LABORS

were also in the department of the Missouri, and consisted largely in the collection and arrangement of information derived from scouting parties in the field, the total mileage covered by the journals of the

officers and men being 22,903. Surveys were also made for roads in Colorado, Arizona and New Mexico; and the military road from Santa Fe to Taos, New Mexico, was completed.

CAPT. JONES' EXPLORATIONS.

Captain W. A. Jones' explorations and surveys have been in the department of the Platte. They have consisted in the collection of geographical information and the embodiment of it in maps, and a field reconnoissance in the country about the head waters of the Yellowstone and other rivers; an excessively mountainous area, lying in the north-western corner of Wyoming Territory, and as yet but little explored. The region is one of rare interest to the student of physical science, and the report of the reconnoissance, besides being a descriptive journal, treats also of the geology, botany, meteorology, entomology, the mineral and thermal waters, and the physical and general geography, of the region. A new route to the Yellowstone Park and to Montana was discovered, and the outlines and character of a remarkable range of mountains, the Sierra Shoshone, lying between the valleys of the Yellowstone and the Big Horn, were ascertained. The range was crossed for the first time by the party, being previously almost unknown, and two passes through it were discovered. A general map of the region traversed was also compiled from the latest reliable data.

CAPT. WM. LUDLOW'S EXPEDITION.

Capt. Ludlow accompanied Lt. Col. Custer's military expedition for the exploration of the unknown country lying principally in the western and south-western portion of Dakota and the eastern part of Wyoming. The expedition left Fort Lincoln on the 2d of last July, with the assurance by the guides they would be opposed by a hostile force of Indians, and that they would never penetrate the fastnesses of the Black Hills; but during the whole route of nearly 1,000 miles not a hostile Indian was seen, and the Black Hills were thoroughly explored, the expedition returning to Fort Lincoln on the 30th of last August. The country first traversed resembled other portions of Dakota, an open prairie with a fair amount of grass, wood being scarce and water not always to be found. On the 20th of July they crossed the Belle Fourche, and found themselves transported to a new country. The whole character was changed. There was an abundance of grass, of timber, small fruits, flowers, and an ample supply of pure cold water. They penetrated to the heart of the Black Hills; valley leading into valley, until they reached the beautiful park

country, marked unexplored upon our maps, of which they had heard much, but hardly hoped to visit. They reached Harney's Peak, a lofty granite mass, 8,000 feet above the level of the sea, and surrounded by craggy peaks and pinnacles. Here scouting parties were sent out and an exit was found by another route, better than the one by which they came.

Capt. Ludlow says that the region of the Black Hills is admirably adapted for settlement; that it abounds in timber and grass; that there are flowing streams and springs of pure, cold water everywhere; that the valleys slope gently and are ready for the plow; that the soil is of wonderful fertility, as shown by the luxuriance of the grass and the profusion of flowers and of fruits; that the climate is wholly different from that of the plains, being cooler in summer, and more moderate in winter. It is not subject to drouth, as the night dews are very heavy; nor liable to excessive rain-fall, for in narrow valleys no indication of overflow could be detected. Game is abundant. The zoologist, Mr. Grinnell, says that, as a game country, it will compare very favorably with any in the United States. Almost all the streams passed were dammed by the beaver, and fresh tracks and signs of the animal were constantly seen.

U. S. GEOLOGICAL AND GEOGRAPHICAL SURVEY OF THE TERRITORIES.

This survey, under Professor F. V. Hayden, with whom is associated Mr. J. T. Gardner, as the head of the Geographical Department, has been engaged from July to September in the mountainous region of Colorado, the accurate mapping and geographical work of which has been extended over 16,000 square miles in the west and southwestern portions of the Territory. The survey of this year has confirmed the discovery of 1872, that Colorado is the great center of elevation in the United States. In the preceding year twenty-six peaks of the average height of 14,000 feet were measured, and this year twenty-four have been added to the number, making in all fifty peaks in Colorado that are about 14,000 feet high, the highest being Mount Harvard, 14,383 feet. Mount Whitney, in the Sierra Nevada, is higher—14,880 feet; but the number of great peaks in California is small as compared with Colorado. In one region, at the head of the Rio Grande and Animas rivers (between meridian $107^{\circ} 15'$ and 108° , and latitude $37^{\circ} 30'$ and 38°), which is about 35 by 40 miles, there are no less than twenty peaks of the average height of 14,000 feet, and nearly one hundred that average 13,000 feet. The sides and spurs of these great peaks are cut by hundreds of quartz veins, bearing gold and silver in large quantities, many of

which, the geologist of the survey thinks, will by washing yield rich returns. Accurate maps and the reports that have been and are to be made of a country so difficult of access, will be of the greatest importance to its development. The scenery of this region is grand and imposing. Its narrow mountain valleys are flanked by peaked ridges from three to four thousand feet high, the summits of which, except in July and August, are covered with snow. South of this mountainous region the country falls off into low plateaus, through which the streams descending from the mountains have worn valleys, which were once the home of a prehistoric people considerably advanced in civilization and the arts, but of whom nothing is known, except the ruins that have been discovered. In a canon, never before explored, of the Rio Mancos, a branch of the St. Juan, in the extreme south-western portion of the Territory, many houses were discovered by the survey, built in the cliffs, which rise 1,000 feet above the valley of the river, most of them in ruins, but some well preserved, of which photographs were obtained with difficulty. One of them (a stereoscopic view of it was here shown) is a dwelling-house, two stories high, built of smooth-faced stones, laid in mud mortar, and with well-constructed windows, that were formerly glazed with mica. The ends of the beams which had supported the floor and the roof were still in the wall, and the whole structure showed not only skill, but taste; the interior being plastered and the walls paneled in red with a white border. It is built on the shelf of a precipice which is 600 feet above the bed of the river. These houses were the homes of an agricultural people, who could exist only upon the scattered spots or oases of that barren country; while wild hordes roamed through the wilderness that surrounded them. That they were driven to these cliff dwellings in the canons for security against the predatory and warlike tribes east and south of them is inferred from the explorers finding in a valley at the west of the canon the ruins of a city, built of stone, which was nearly a mile square. It was surrounded by a wall that was fifteen feet in thickness, and flanked at the angles by towers for defense. The wall was faced with dressed stone, laid in regular courses, and imbedded in mortar. The inside of the wall had been left in the rough state, and over the ruins in the interior large trees had grown up, as natural monuments that indicate the time that must have elapsed since this carefully built city was peopled by human beings.*

* NOTE.—Photographs have been taken of all these ruins, and their investigation will be followed up during the coming season. A physical atlas of Colorado, in six sheets, upon a scale of six miles to the inch, will be published by the survey,

PROFESSOR POWELL'S EXPLORATIONS.

Prof. Powell's report of the survey of the Colorado appeared last April. The region surveyed is, in a geological point of view, one of the most interesting in the world; the river and its tributaries traversing those canons or great chasms, some of which are more than a mile in depth below the general surface of the region. The report contains a general summary of the entire work: the geographical description of the country, its arable valleys, its supply of water, the extent of timber and pasture land, and its mineral products; the geology of the region; its natural history, and, lastly, an exceedingly interesting account of the races that peopled it, their customs, mythology, poetry, and arts. About 45,000 square miles has been already surveyed, and half of the region mapped.

PROFESSOR MARSH'S INVESTIGATIONS.

Professor Marsh returned last December from his fifth expedition for the exploration of the fossil region of the Great West. He has had no less than eleven different parties during the year engaged at various points in the Rocky Mountains under his direction, and a larger amount of fossils have been brought to Yale College than has been collected by all the other museums in the country. The remains of the animals found during the year are all of a tropical species and widely different from any now living. They were imbedded in the basin of an ancient lake of the Miocene period. He considers his last expedition as the most important in its results of any yet undertaken, and when these deeply interesting remains shall have been studied, a flood of light will be thrown upon the past physical history of the world, and, in connection with other researches, upon the plants that flourished, and the animals that existed upon our own continent at a very remote period of time.

PACIFIC OCEAN.

Commander G. E. Belknap, charged with ascertaining a practicable route for a telegraph cable between Japan and Puget Sound, carried on a series of deep sea soundings in that part of the Pacific Ocean, which are of the highest interest, as they confirm the great depth of the Pacific and the powerful action of submarine currents. The ocean bed along the route examined was very irregular. The water

showing in detail the geology, topography, and the distribution of forest, grazing, agricultural, and mineral lands. A bulletin has also just appeared, giving an account of the ruins.

deepens rapidly the moment the land is left. The sea bottom between the Aleutian islands and Kamchatka forms a ridge, the highest part of which is 1,777 fathoms beneath the surface; 80 miles further out the unlooked-for depth of 4,037 fathoms was found, while 30 miles further on, the depth was only 2,763 fathoms. These soundings disclose a range of submarine mountains, apparently of volcanic origin; a trough, which it is supposed the Kuro Siwo, or warm Japanese current, has cut through the rocky bed of the Pacific, and a broad plateau, or table, reaching from Vancouvers island to the Aleutian group. The soundings of the Tuscarora have been continued by Commander Erben, to ascertain the suitability of the ocean bottom for a telegraph cable from San Francisco to Honolulu, in the Hawaiian islands, and the result is that it is suitable over the whole distance, from its almost unvarying soft, oozy bottom.

ALASKA.

M. Pinvert has been engaged for two or three years past in geographical and ethnological investigations in Alaska and the Aleutian islands, the details of which he laid last summer before the French Geographical Society, who awarded him their gold medal.

Of his geographical labors or knowledge I cannot say much in commendation. He has claimed as his discoveries and given names to places already existing upon Russian maps, and which are found upon our own charts in 1846, and the Archipelago which he has named after the statesman Thiers, excepting what was already known, does not exist. His ethnological researches are entitled to more consideration, for he has a remarkable faculty for the acquisition of languages, and has, no doubt, in his communications with the various tribes inhabiting the regions traversed by him, acquired much more information than an ordinary traveler would obtain. He is of the opinion that the Esquimaux inhabiting this region are of the same stock as those of Greenland and Baffin's Bay, and his conclusion from their legends and traditions is that they came originally from a country in the south of Asia, where cold, storms, and the art of navigation were unknown. He supposes that their ancestors were driven by war from their Asiatic homes, and that a portion settled in the Aleutian islands, and another portion crossed Bherings Straits and separated into two branches; one of which went across North America and peopled Labrador and Greenland; whilst the other went along the Pacific coast as far as Mount St. Elias. Before conclusions so extensive as these can be accepted, it will be necessary to know upon what they are based. Mr. W. H. Dall, who, in connec-

tion with our coast survey and the Smithsonian Institute, has been engaged for several years in explorations and investigations in Alaska and the Aleutian islands, and who is a careful observer, has found nothing to indicate an Asiatic origin, but, on the contrary, from the remains he has found, and from what he knows of the currents in this region, he doubts the probability of there having been any such emigration from Asia in the direction which M. Pinvarth supposes. Many American ethnologists moreover think that Greenland and the adjacent shores of North America were peopled from Europe.

W. H. DALL'S EXPLORATIONS.

Mr. Dall's labors during the present year have been along the coast from Cape Spencer to Mount St. Elias, the whole of which has been examined, and many grave errors corrected. The coast was found to extend from four to seven miles further west than as delineated upon our present maps. The region is one of extensive glaciers, which have been examined and mapped for the first time. Twenty-four positions were determined, 17 manuscript maps made, and 4,000 astronomical and 900 magnetic observations taken, which, together with miscellaneous ones, amount in all to about 12,000. The curious caves, previously explored, were re-examined, new shell-heaps have been found, and many thousands of ethnological specimens were brought to Washington. In the collections now there of McFarland, Kennicut, and Dall, we have a larger collection of ethnological material relating to the western Esquimaux than there is in all the other collections of the world put together. Some additional facts should be added to my former statement of Mr. Dall's investigations, which are: that the shallow basin of Bherings Sea, at the north-west point of Oonalaska, dips suddenly down from 60 to 800 fathoms; that, further north-west, the bottom slopes down to 1,100 fathoms; and that the theory of a current flowing around Bherings Sea in a circular direction is without foundation.

As the Society took a very active part in urging the negotiation on the part of Mr. Seward for the purchase of Alaska, and as there were many then who thought we were paying a very large sum for a useless territory, it is gratifying to be able to state that the income now derived by the Government from this territory, after payment of all expenses, is greater than that from any other territory, and will in twenty years extinguish the debt. The southern portion of Alaska has a comparatively mild climate, and is capable of maintaining a large population. Potatoes, barley, rye, and probably oats, can be cultivated; its agricultural resources being about the same as Norway

or the Orkney Islands. It is an immense timber region, with great facilities for transportation, and it will continue for a long time to supply the products of fur-bearing animals, provided this branch of industry is properly protected.

ANCIENT INHABITANTS OF NORTH AMERICA.

Professor F. W. Putnam, of Salem, Mass., has been engaged in researches respecting the ancient inhabitants of North America, and has made some exceedingly interesting explorations of caves, mounds, fortifications, and other remains of the unknown, prehistoric people who, at a remote period, occupied Ohio, Indiana, and adjacent parts of the West, usually referred to as the Mound Builders. He believes that the southern Indians were not connected with the northern or eastern tribes, but belonged to older inhabitants of the country, much farther advanced in the arts of civilization; in other words, that the southern Indians, the Mound Builders, and the ancient inhabitants of Mexico were of the same original stock, although greatly diversified by immigration and by mixing with other races by whom they were conquered and absorbed. Ohio and Indiana are especially rich in relics of these widely separated families. Near Lexington, Indiana, he found the remains of an ancient camp or town, protected by a palisade, connected with which was a "refuse circle," composed of the remains of pottery and the bones of animals. He found a "rock shelter" near Grayson Springs, Kentucky, in which were bones of animals, fragments of pottery, and bone implements. On small, shelving rocks at the back of this place of retreat and shelter were indications that cooked food had been placed on the shelves for use, and that the occupants had hastily left. He explored a cave near the Mammoth Cave in Kentucky, belonging to the same proprietor. In a small chamber, where the foot of a white man had never before trod, he found in the clay the imprints of feet, shod with peculiar moccasins or sandals of some braided substance, the naked heel and toes and the braided imprint of the sandal covering the rest of the foot, being as distinct and tenacious in the clay, as though imprinted but yesterday. He also found a number of cast-off sandals, finely made, of twisted leaves of some kind of rush, braided in an artistic way, resembling the mode of braiding straw sandals in China. In this chamber was also found a piece of cloth, regularly and finely woven, which had been dyed or colored in black stripes, and mended by darning, together with other objects of interest.

Between 1812 and 1815 bodies, buried with great care, together with other articles, were discovered in the caves of Kentucky and

Tennessee, among which bodies was one then widely known as the "Mammoth Cave mummy." These articles were supposed to be lost; but Mr. Putnam found them, though sadly neglected and many missing, in the collection of the American Antiquarian Society at Worcester, and was able to identify them as the same in material, design, and structure, with those left by the race occupying the cave he had explored.

A number of Indian crania have been obtained by Scientific members of the Wheeler Expedition at considerable risk from the Ute burial grounds and the valley of the Great Salt Lake, as well as ancient implements used by the aborigines.

A correspondent of the St. Louis *Republican* gives an account of the discovery during the year of extensive ruins on the Gila river, near Florence, in Arizona. He describes the principal ruin as a fortification of stone, 1,600 feet long and 600 feet wide, within which are the remains of a greater structure of roughly hewn stones, 200 by 260 feet, the wall in some places being perfect to the height of 12 feet. Two towers are standing at corners of the outer fortification, one 26 and the other 32 feet high, with indications that they were formerly much higher. He further states that a few copper implements, some stone utensils, and two rudely cut stone vases, like those of Central America, were found. These newspaper statements of discoveries of this nature, with which no responsible name is connected, are to be accepted with great caution, for they are frequently invented to puzzle the learned or to benefit the newspaper. Arizona, however, is a land of the ruins of a prehistoric race of whom we have no history or tradition, and there is nothing intrinsically improbable in the alleged discovery.

Mr. Thomas Croft, of Papeeti in Tahiti, has transmitted to the California Academy of Sciences, photographs of curious hieroglyphics in wood recently found in Easter Island, and which are supposed, from the vague tradition current amongst the inhabitants of the island, to represent the language of a prehistoric people, of which the present inhabitants are the degenerate descendants. Mr. Croft says that none but the priests and a limited few can decipher these hieroglyphics, and in another letter to the Academy, he says that he has found a native who can read them, and who is to teach him the language; that he will shortly be able to translate them, and he thinks that he has discovered the relics of a great Malayan empire that at some former period extended its power over the whole of this part of the South Pacific. Easter Island has long been an object of interest to archæologists, from the fact that it is a small volcanic

island of about forty miles in circuit, with an iron-bound and almost inaccessible coast, without fresh water except such as falls from the skies, without wood for fuel, and destitute of domestic animals, except a few fowls; but upon which there are a number of colossal statues, some of them fifteen and eighteen feet high, erected upon platforms, which, though rude, display a knowledge of art superior to that of the present people of this part of the Pacific.

OTHER AMERICAN EXPLORATIONS.

What has been done in explorations for a ship canal across the isthmus was so fully laid before the Society by Lt. Collins, last spring, that it is only necessary for me to state that he has gone out this winter for a fourth and final exploration of the route by the Atrato, and that Commander Lull has also gone for the examination of what is known as the Garella route.

Dr. Harkness has examined an extinct volcano in Plumas county, California, three miles long and half a mile wide, which he thinks has been of recent origin. He also reports the discovery in the same part of California of a lake hitherto unknown to civilized man, which he says is 7,330 feet above the level of the sea.

Mr. N. H. Bishop has undertaken to explore the inland waters of the coast of the United States along the Atlantic coast, bays, inlets, etc., alone in a canoe, and when I last heard of him he had gone over a large portion of the coast.

Mr. V. Colvin has been engaged for the last two years in the survey of the Adirondack wilderness in the State of New York. He has found the source of the Hudson in a small lake 4,326 feet above the level of the sea, with the poetical name of "Tear of the Clouds." I regret that my limits will not admit of a more extended notice of his very valuable and interesting report.

CENTRAL AND SOUTH AMERICA.

Prof. W. M. Gabb, of Philadelphia, has for a year or two past been engaged in the exploration of an unknown part of Costa Rica, now occupied by savages. His object was to discover its mineral resources, a tradition existing that its mines had been formerly worked by the Spaniards. He has, however, also given great attention to the geological structure of the country, and has discovered two previously unknown volcanoes, about 7,000 feet high, and finds that the highest peak in the country is Pico Blanco, which he estimates at 10,700 feet. He has made collections of unusual magnitude in natural history, given special attention to the ethnology and philology of the region,

and is said to be now upon the track of an ancient buried city, of which no mention is made in any history of the country.

Mr. T. Belt has given, during the year, the results of his journey in the savannas, forests and ruins of Nicaragua. Much of it relates to natural history ; but he has also collected facts bearing upon the glacial epoch, and assumes conclusions in respect to that period, which have, during the year past, been disputed by other geologists. He found, 3,000 feet above the sea, great blocks, which he infers to have been of glacial origin, being as he thinks due to land glaciers and not to icebergs. He goes as far as Agassiz in the theory of huge northern and southern ice caps extending from the poles toward the equator. If he is right in finding evidence of land glaciers in Nicaragua, it is a fact of great importance, which complicates the glacial inquiry, but by no means establishes the ice cap theory. He claims that this great ice cap extended over North America from the Pole to the 39° N. lat., and that from thence along the high lands of America to the tropics, and that in Central America, all the land 2,000 feet above the sea supported glaciers ; that it descended to lat. 50° in Central Europe, and to lat. 52° in North-western Asia. Mr. S. F. Campbell, after observations made during thirty-three years, denies that there is any evidence of a continuous solid ice cap extending over the plains in Europe or America to or nearly to the equator ; but, he says, there is a great deal to show ancient ocean circulation of polar and equatorial currents like those which now move in the Atlantic, and much to show the existence of large local ice systems in places where no glaciers now exist ; which is substantially the theory of local glaciers in particular places maintained by Prof. Sterry Hunt in opposition to Agassiz and Geike, the Scotch geologist.

A very important part of Mr. Belt's work in Nicaragua has been the close observation of cyclones. He maintains, and very forcibly, that the received theories of the cause of cyclones are incorrect. He says that there is a complete gradation from the little eddy that stirs up the leaves, continuing through the large whirlwind and up to the most destructive hurricane, and that the mistake hitherto has been in forming theories respecting the larger, instead of carefully observing the smaller phenomena ; which latter course he pursued and came to a conclusion as to the cause of cyclones, which is favorably received by eminent scientific men.

Prof. Lorenz, a botanist, who has been engaged in botanical explorations over a wide area in the lower part of South America, concludes, from the evidence supplied by the geographical distribution of the plants, that this part of South America was raised above the

ocean bed at a later period than the neighboring regions of Brazil and Chili.

A French expedition has been exploring Terra del Fuego. They found a large lake 25 kilometres in circumference, surrounded by luxuriant vegetation, and covered with wild fowl. The region was inhabited by a rude but hospitable people, the women being especially affable and obliging, one of whom exhibited a relic to which she attached immense value — the lid of a box of sardines.

An expedition has been organized for the exploration of the Peruvian mountains, and the inner Chancamayu, Perene and Tambo, to ascertain if they are navigable to the Amazon.

Captain Musters, R. N., the explorer of Patagonia, has been engaged during the past year in valuable geographical work in Bolivia, fixing the longitude of places and ascertaining the altitude of elevations, and Commander Cilley, a retired officer of our Navy, has also been engaged in Bolivia and Paraguay ascending rivers, ascertaining their true course and to what extent they are navigable.

Immense deposits of guano have been found on the Peruvian coast, north of the river Loa, which is the boundary between Peru and Bolivia. They are computed to amount to £52,000,000, being more than the public debt of Peru.

An important piece of information has just reached us from Brazil, that the government has requested Professor C. F. Hartt to submit a plan for the survey of Brazil. There is no country on the globe where a survey is more important, and under Professor Hartt, it would be in most excellent hands.

ARCTIC.

The Arctic event of the year has been the return of the officers and crew of the *Tegethof* of the Austrian expedition, and the important discoveries made by them. This expedition, in the difficulties it encountered, the perseverance displayed, the discipline maintained, and the success achieved, is about as heroic as any thing that has occurred in the history of Arctic exploration. I gave the details of this expedition in my address two years ago, up to the time, the 14th of August, 1872, when the *Tegethof* and *Isbjorn* parted company; the *Tegethof* under Lieutenants Weyprecht and Payer, to attempt the passage around Cape Tscheljnskin, and to the northern coast of Asia, to Behrings Straits. What has happened in other maritime expeditions, and what frequently happens in human life occurred. They did not accomplish what they undertook to do, but achieved something different, and of more interest, by being carried

into an unknown region, to a point farther north, than had yet been reached by man. The *Tegethof* shortly after leaving the *Isbjorn* was frozen in for 28 days, off the coast of *Nova Zembla*, and when the ice broke up, the party found themselves immovably fixed upon an ice floe, drifting forward and backward, and subject to the constant pressure of the surrounding ice, until the 13th of October, when the ice floe on which they were, crumbled away, and the vessel was forced up above the level of the ice on her larboard side, in which position she had to be supported all winter by props. It was a dangerous situation, in which she was constantly changing her position from the shifting and pressure of the ice. They had therefore to be ready to abandon her at any moment, and it required such unintermitting attention that the crew had but little opportunity for rest, and scarcely during the winter took off their clothes. The cold was so intense that they could not make any attempt to free the ship until the 15th of April, when they undertook to saw out a canal for the passage of the vessel, but it was in vain. After sawing in different places from twelve to twenty feet, to the water below, it was only to discover that there was still farther down another thick layer of ice, and the only effect of this unremitting toil was that the fore part of the vessel lay in a sort of dock, whilst the after part was fixed in ice of prodigious thickness. In this way she continued to drift to the north, until the 31st of August, when land was discovered ahead at a distance of fourteen miles. It was a lofty mass stretching far to the westward and northward in $79^{\circ} 43' \text{ N. lat.}$, and $60^{\circ} 23' \text{ E. long.}$, but the cracks in the ice were so numerous, that no landing could be effected, and for more than a month they were gazing upon this mysterious land without being able to set foot upon it. The vessel continued to drift to the north until in October she passed the 80th parallel, and finally, in November, the floe upon which she was immovably fixed was driven up upon an island of the coast which they called *Wilczek's land*, and was frozen in, in the place where she was finally abandoned. To use the language of *Lieut. Payer*, they were for fourteen months mere passengers upon an ice floe. The long Polar winter of 175 days now set in, when the cold was so severe that the quicksilver remained frozen for weeks, and the darkness in mid-winter was intense. In March, *Lieut. Payer* set out on a sledge expedition, to explore the new land, but little could be done, for the cold was still intense, every article of clothing was frozen like metal, and a strong rum lost all its potency and fluidity. A similar expedition, however, was undertaken on the 24th of March, and was more successful. The land, to which they gave the name of the *Austrian*

Emperor, Franz Joseph Land, is about the size of Spitzbergen. It resembles East Greenland, and is in two large masses, east and west ; one of which they call Zichy, and the other Wilcez Land, after Count Wilcez, the arctic explorer and the munificent promoter of the expedition. They found it the most desolate land on the face of the globe. At the south-west the mountains rise to the height of 5,000 feet with vast depressions between, filled with gigantic glaciers. On the 8th of last April, the land exploring party reached $81^{\circ} 37'$ N. lat., and after traversing a glacier they came upon a country which they called Crown Prince Land, where they found the cliffs covered with thousands of ducks and auks ; seals lay upon the ice, and there were traces of bears, hares and foxes. Here they found open water, and were greatly impressed by the grandeur and beauty of the surrounding scenery. Their furthest northern journey was on the 12th of last April, when they followed the coast to $81^{\circ} 57'$ N. lat., and over a sea comparatively free from ice, saw land in the distance, which seemed to stretch beyond the 83d parallel of North latitude ; which land, the farthest known upon the globe, they most appropriately called after Petermann, the distinguished and indefatigable German geographer. On the 20th of May they had to abandon the vessel, leaving in her their journals, and with sledges and boats they undertook the return journey, which lasted over three months, the trials and hardships of which were exceedingly great ; until at last, in the mouth of the Puhova river, they fell in, on the 24th of August last, with a Russian schooner, by which they were conveyed to Varsoe in Norway.

It is impossible to speak in terms too laudatory of the discipline, the high purpose, the calm courage and unyielding perseverance that distinguished this expedition on the part of both officers and men. Not a single instance of insubordination occurred, and the intelligence, patience and unity of action that was displayed, contrasts strongly with the vacillation, petty squabbles and ineffective discipline on board the *Polaris* on our own expedition.

The peculiar geographical circumstance in this expedition is, that in other attempts to reach the pole, where vessels have been caught in the ice and drifted, the drift has usually been to the *southward* ; but in this case the *Tegethof* drifted *northward* to the place where she was finally frozen in and abandoned. Dr. Chavanne, in an article in *Petermann's Mittheilungen*, from this circumstance and meteorological observations and other facts which he enumerates, comes to the conclusion that the Gulf Stream is prolonged in this direction through the arctic, though submerged by the cold polar current over

a certain distance, when it again reappears and runs along the western coast of Asia near to the eastward of the New Siberia islands, where it meets the Kuro Siwo, or warm Japanese current, which flows through Behring's Straits, and that the two warm currents thus united lave the shores of the Arctic Continent, so as to render the existence of perennial ice there impossible. Capt. Bent went much farther than this in his theory, which was, that these two warm currents met at the pole, and produced there, by the warmth and mingling of their waters, an open polar sea. He moreover looked upon them as surface currents, by carefully following which a vessel might reach the pole; that they were, as his theory was called, "The Thermometric Gateways to the Pole." Lt. Weyprecht says, and he had ample means of ascertaining the fact, that the drift of the ice upon which the Tegethof was carried north, was in no way owing to the Gulf Stream; nor does he believe in the existence of an open polar sea, but says that there is no foundation for the conclusion that the ice on the south of Franz Joseph Land is impenetrable. Lt. Payer also has no belief in an open polar sea. He does not, however, think that north of Franz Joseph Land is accessible by ships. In his opinion, if they should succeed in getting past this ice barrier, the chance of their getting out again would be slight, and he regards the route by Smith's Sound as the best.

The Austrians are to send out another expedition next summer for the further exploration of Franz Joseph Land, under the same commanders, Lieutenants Weyprecht and Payer. It is to be divided into two parts. One under Lt. Payer, which is to proceed by the way of Behring's Straits, and the other, under Lt. Weyprecht, by the former route east of Greenland. The Germans have also determined to send an expedition in the same direction at a cost of \$300,000, to start, if possible, next June.

The English government has at last yielded to the requests of the Royal and the Geographical Societies to send out an expedition by the way of Smith's Sound, the route so long advocated by this Society, and which is now generally recognized as the one presenting the greatest advantages. The Admiralty have selected Rear Admirals McClintock, Sherard, Osborne and Richards to advise as to the fitting out of the expedition which is to leave next June, and is to be commanded by Captain Nares, the distinguished commander of the Challenger, and one of the vessels by Commander Markham. The expedition is to consist of two steam propellers, one of which is already purchased. There is to be a naturalist and geologist in each ship, and each officer, between the time of his appointment and the de-

parture, is to take up some special branch of scientific investigation. The well-known Carl Petersen of Upernavik is to go as dog driver.

The results, geographical and scientific, of the voyage of the *Polaris* are not yet fully worked out, but, so far, have been enumerated as follows: The vessel reached $82^{\circ} 16' N.$, the highest latitude before attained by a vessel. The navigability of Kennedy's channel was proved. Seven hundred miles of coast line were discovered and surveyed. The probability was strengthened that Greenland is an island, having been separated from the continent in a north direction, and a very great number of scientific observations were made, embracing a large range of subjects, such as ocean physics, the force of gravity, astronomy, magnetism, meteorology, and natural history, which would alone justify the sending out of the expedition. The magnetic observations are said to be more complete than any other before made in the Arctic.

EUROPEAN RESEARCHES.

In Europe the governmental surveys heretofore commenced have been continued, and the long projected measurement of an arc of the meridian was begun last autumn. There have been several explorations of caves for the discovery of remains of prehistoric races. A skeleton was found at Mentone, of greater antiquity than the one in the museum of Paris; and in the Victoria cave in England, a human bone was found with the remains of elephants, rhinoceros, cave bears, hyenas and bisons, indicating the existence of man in England with these animals in the glacial period, and probably before it.

ARCHÆOLOGICAL DISCOVERIES.

That the remains of the ancient city unearthed by Dr. Schliemann is Troy, is still contested. Those who dispute it, however, are scholars who have never examined the locality, whilst, on the other hand, M. Emile Burnouf, one of the few scholars who are really authorities in such an inquiry, has, at Dr. Schliemann's request, examined his collection, and in an article in the *Revue des Deux Mondes*, evidently inclines to the opinion that it is really the ancient city of Priam that has been discovered. Mr. Gladstone, the late premier, also an authority, after comparing the discoveries with the poem, finds "an undeniable and close correspondence;" and Professor Keller of Friburg, a classical scholar of repute, who has examined both the collection and the locality, is unhesitating in his belief that the remains discovered are those of Troy, and gives his reasons in a letter to an American correspondent, extracts from which have been published in the

New York *Nation*. Dr. Schliemann, by an arrangement with the Turkish government, resumed his excavations last April. The value of his previous discoveries does not depend upon the question whether he has or has not discovered the site of ancient Troy, but, as has been truly remarked by the editor of the *Nation*, that, in the twenty thousand objects discovered by him, we have records which carry us back to the childhood of the world.

The recent excavations in Pompeii show that what has been revealed after the course of so many years, is after all but a small part of the city, and this is not only now indicated, but every extension adds new objects, and some of the deepest interest. A house was unearthed during the year, and upon the inner wall was a large painting of Orpheus, with the head bent listening to his music. Nothing connected with Pompeii has been of such interest as the discovery of its paintings. Of the architecture and sculpture of antiquity we were enabled to form an opinion from what has come down to us; but the paintings of Parrhaseus, Zeuxes, Appelles and other great masters had perished, and but for the discoveries in Pompeii we would have been unable to judge of the excellence to which the Greeks had arrived in the art of painting. The bringing to light, therefore, of this large picture of Orpheus after its long imprisonment of 1,800 years, is very interesting.

The excavations that are now going on in Rome are bringing to light numerous quantities of objects especially on the Esquiline, relating to nearly every thing connected with both the public and private life of the Romans. Ink-stands and bronze pens enough have been found to supply the notaries of the modern city. The coins are principally of bronze, but there is a large amount of gold and silver money. An Etruscan cemetery has been found on the Esquiline, and in the tomb of a priest the gold threads that were woven into his robe remained when every thing else had crumbled into dust. Eighty-two statues have been dug up, and amongst a great variety of tools, implements, and utensils, is the knife of the jockey of a circus, on the ivory handle of which is roughly cut the plan of the circus, his horse, his whip, and the palm he wore as a prize.

An ancient Egyptian medical treatise has been discovered by Professor Ebers, of Leipsic, which, by a calendar on the back of the papyrus, discloses that it was written 1600 years before Christ. It is a handbook of Egyptian medical science at that time, and a complete book from beginning to end; the historical and geographical interest of which is that the description of the drugs mentioned in it shows that at that period Egypt had extensive commercial relations with

Western Asia, and that there existed then an interchange of thought and knowledge. Recipes are given, borrowed from a celebrated physician in Phœnicia, and others derived from older medical works, which are referred to by name. It is to be translated, and will be the means of tracing the history of medical science from its early dawn.

ASIA.

In Asia, the geographical explorations and researches have, during the year, been numerous and widely distributed. The Sea of Aral has been surveyed by the Russians, and found to be 165 feet above the level of the ocean, and 250 feet above the Caspian. They have explored, in a steamer, the eastern branch of the river Oxus from its mouth in the Sea of Aral, for 200 miles, reaching the main branch of that river on the 5th of last August, and have also explored the former bed of the Oxus, finding that the old river flowed in two channels which are now dry, and that the country which those channels formerly drained, was the seat of an extensive civilization, of which nothing now remains but the ruins.

Mr. Forsyth's mission to Kashgar has been completed, and the treaty between the ruler of Kashgar and Great Britain was signed the 4th of last February. Colonel Gordon, a member of the party, crossed the unknown Pamir steppe at a height of 13,000 feet, and found a miserable country peopled by about 1,000 inhabitants, the winter climate of which is exceedingly severe.

Father Velinden, a Belgian missionary, has traversed the Ordos country in Mongolia, and has given a very interesting account of the people. A son of M. Lesseps has been employed in exploring the Himalaya mountains, with a view toward a railroad across Asia, and M. de la Porte has explored a part of Cambodia, and completed, with M. Moura, a map of the portion of Cambodia under the protectorate of the French. The river Hangkiang, in China, until hitherto almost unknown, is found by the Abbe David to be a river of great commercial importance, which is traversed by vessels of the largest class, and a British expedition has been organized, with the consent of the Chinese government, for the exploration of the province of Yunan, from the Burmese border. For the last four years, the rich and prosperous country around Tien-Tsin, in China, for an area of over 40,000 square kilometres, has been lying under water to a depth of nearly five feet — the result of inundations — and the unfortunate inhabitants of this once fertile portion of China have been driven away to create new homes in the waste country north of the

Chinese wall. Colonel O. Baker and Lieutenant W. E. Gill, R. E., have made a most interesting journey through northern Persia. They describe Kilat as one of the most remarkable places in the world, which might, they say, serve for Dr. Johnson's "Happy Valley" in the romance of Rasselas. It is entered by five gorges, each about three yards wide, the sides of which tower up perpendicularly like walls, so that this valley fastness is, if any thing can be, impregnable. The inhabitants live upon what is grown within, and therefore can never be starved out. The only drawback upon this otherwise exceptional spot is that it is not healthy, being too much confined.

The great surveys in India have been actively prosecuted during the year, and it is now computed that a survey of the whole of India will be accomplished within ten years. Sir George Campbell has been extensively among the native tribes, dwelling both in India and China, and has given an interesting account of the Kassia tribes between Siam and Birmah, where the doctrine of woman's rights is thoroughly carried out. The land is owned by the women. A woman lives in her own house, proposes to the husband, marries him, and if, at any time afterward, she is dissatisfied, exercises a free right of divorce; the consequence, however, of this is, that the women do the largest share of the work; the men, he says, feeling themselves to be the weaker vessels, and not responsible for the maintenance of the family, do comparatively nothing, and take life easy. Mr. J. Walhouse has visited a savage tribe on the western coast of India, called the Karagar, a remnant of a very ancient people, remarkable for their unswerving truthfulness. The practice prevails among them of wearing, over the usual garment, an apron made of green leaves, which is now, however, confined to the women. He thinks it is a badge of degradation, and the survival of a very ancient custom, a remark suggesting the passage in Genesis respecting Adam and Eve: "They sewed fig leaves together, and made themselves aprons."

General Cunningham, of the Archæological Survey, has explored the central provinces, and made discoveries of great importance among Buddhist remains at Bharahut, a place 120 miles south-west of Allahabad. It is the site of an ancient city, supposed to be one mentioned by Ptolemy, which, sixty years ago, was buried in dense jungle. In the midst of the jungle a building was found, surrounded by a stone railing or colonnade, nine feet high, profusely sculptured, with an inscription on nearly every stone. The age, as shown by the inscription, was two centuries and a half before Christ. The inscriptions are chiefly the records of donors of columns, like those we

see in the gift windows of our own churches. These sculptures are regarded by General Cunningham as the most valuable acquisition that has yet been made to our knowledge of ancient India. They record the dresses of all classes of the people at a period of three quarters of a century after the death of Alexander the Great; their houses, temples, personal ornaments, various kinds of animals, etc., and throw light upon the religion and customs of India at that early period. Some are humorous scenes, in which monkeys and elephants are the principal characters. One represents an elephant captured by monkeys, who have fastened a billet of wood along the length of his trunk so as to prevent his moving it. Ropes are fastened to his head and body, with which he is pulled along by the monkeys, who are dancing in a triumphant procession to cymbals played by other monkeys. The design, he says, is spirited, and very droll, though the execution is coarse. Our member, Mr. Frank Vincent, Jr., has published, during the year, an exceedingly interesting account of his journey in Siam, and of his visit to the remarkable ruins in Cambodia, to which I have so frequently referred.

The discovery in Bharahut and Cambodia of the stately ruins of former civilizations, overgrown by and buried in jungle, brings to mind the difficulties civilization has to struggle with in India from the rapid growth of vegetation, among which may be mentioned the advantages which this teeming vegetation affords for the harboring and increase of beasts of prey. During the last fifteen years, in the Presidency of Bombay alone, 13,400 human beings were killed by tigers, leopards, and other wild beasts.

Mr. V. Ball, of the Geological Survey of India, gives an extraordinary account of children found living with wolves in the north-western provinces of Oude. A boy was found in a wolf den by some Hindoos who were hunting. He had been burned out of the den, with the wolves. He was covered with scars and wounds, and was in his habits a wild animal in every respect, drinking like a dog, and preferring a bone and raw meat to any thing else. He would not remain with the other children, hiding away in dark corners, never wearing any clothes, but tearing them in shreds, and he died a few months after being taken. Another boy, fourteen years of age, was found among wolves, who learned to make sounds, but after six months had not learned to speak. Both boys were remarkable for the facility with which they moved about on their hands and feet. Before they would eat or taste their food they would smell it, and if the smell did not suit them, would throw it away.

PALESTINE.

Lieutenant Conder, R. E., has made important discoveries of ruins in the hill country of Judah, which he thinks he can identify with some of the lost Biblical cities. He has found boundary stones, which may prove to be the ancient Levitical landmarks. Mr. Henry Maudsley has also made recent discoveries upon Mount Zion. Lieutenant Conder says that the whole of Palestine will be surveyed within four years; that 300 square miles are now added to the map, being five times as much as was at first expected to be accomplished.

At the mouth of the Persian Gulf there is a small island of about twelve miles in circumference, called Ormus, or more properly Hormus. Though a barren rock, without vegetation or soil, it became, in the 16th century, from its geographical position, a place of great commercial importance and wealth, where the trade between Europe and the East was transacted. A town arose three miles in length along the coast, and two miles in width, and its merchants extended their commercial relations over Persia, Mesopotamia, and as far as the chief cities of Turkistan, Samarcand, Bokhara, and also to India. The Abbe Raynal describes Hormus as presenting a more splendid appearance than any city in the East, where persons from all parts of the world exchanged their commodities and transacted their business, and he says unusual opulence, an extensive commerce, the politeness of the men, and the attraction of the women, made it the seat of pleasure as well as trade. Milton refers to it in the well-known passage in "*Paradise Lost*," describing Satan in council :

High on a throne of royal state, which far
Outshone the wealth of Ormus and of Ind,
Satan exalted sat.

Last March, Lieutenant Stiffo, of the British Navy, visited Ormus, and found that even its building materials had been carried away, and that nothing remained of the once great and opulent city but a ruined minaret about seventy feet high, mounds strewn with broken pottery, and a vast number of water cisterns now choked with earth.

AFRICA.

Lieutenant Cameron, the commander of the Livingstone Relief expedition, after fulfilling the last duties of that trust, by transporting the remains of Dr. Livingstone to the coast, and securing the diaries and effects of the great explorer, devoted himself to the following up of Livingstone's explorations, and has made a most important geographical discovery, which fixes the farthest source of the

Nile within known limits, and which, there is every reason to think, will connect the network of lakes and rivers of the water system that Livingstone was investigating, with the great rivers that flow to the Western coast of Africa, and probably with the Congo.

Burton, one of the most accurate and reliable of investigators, when in 1858, he, with Speke, discovered Lake Tanganyika, ascertained, from native information, that a river flowed into this lake from the north, called the Rusizi, and another flowed from it, at its southern extremity, called the Marangu, which information, if correct, showed that Lake Tanganyika had no connection whatever with the Nile. This conclusion, however, was disputed, among others by Sir Samuel Baker, who, from information he had received, concluded that it was connected by a river with the Mwtan Nzige, or as Baker called it, the Albert Nyanza, and also by the late Dr. Beke, an eminent geographer and traveler, who maintained that the lake had no outlet. As respects the north of the lake, the correctness of Burton's information was corroborated by Livingstone and Stanley, who found the river Rusizi and ascertained that it and the other stream at the north flowed into Lake Tanganyika, so that there remained but the question, whether, farther down at the south, there was an outlet from which the waters flowed out of the lake, and this question Lieut. Cameron has settled. He devoted two months to the survey of the lake, during which he fixed the position astronomically of places, and ascertained the elevation of Lake Tanganyika to be 2,710 feet. He then proceeded in a boat along the eastern shore to the southern extremity of the lake, examining river after river, and found that they all flowed into it; upon which he continued his exploration up the western side, and, after carefully examining the shore for a distance of a little over one-third of the length of the lake, he found the outlet on the third of last May at a point twenty-five miles south of the Kasenge islands, which have been visited by both Speke and Livingstone. This outlet is a river called the Lukuga, flowing toward the west with a very slow current one or two knots an hour, such as is characteristic of the outlets of lakes where there is no great or sudden depression. He went into the river for a distance of four or five miles, when the further progress of the boat was stopped by floating grass and enormous rushes. He was informed, however, by the chief, who was very friendly, that this outlet flowed into the river Lualaba, which, it will be remembered, was the river that Livingstone was following up and was compelled to abandon and return to Ujiji, when Stanley found him. Lieut. Cameron also believed, from the native information

which he obtained, that the Lualaba is connected by a network of waters with the Congo, and resolved to ascertain the fact. He accordingly returned to Ujiji to make the necessary preparations, and, on the 23d of last May, he started directly across the Manyuema country to descend the Lualaba to its supposed connection with the Congo. It is to be regretted that he is but poorly provided with means, as the undertaking is one of great difficulty, and requires qualities of the highest kind, which, however, the brave young explorer has so far shown in a remarkable degree. If he should be successful, we may next hear of his returning through the Congo to the western coast; and, if he effects this, it will be one of the most important geographical achievements that has been accomplished in Africa, and place his name in the very front rank of African explorers. His account of the effect of the slave trade but intensifies that of Livingstone. In his journey around Lake Tanganyika, he was constantly shown places where there had been villages, the inhabitants of which had been carried off as slaves. He states that there is a great internal slave traffic; that it has depopulated large tracts, and that the wretched fugitives are now driven to sell each other as a means of subsistence.

We have received from Col. C. C. Long, chief of Gen. Gordon's staff, a most interesting account of his exploration of the Victoria Nyanza, and of the river found by Speke, which connects that lake with Lake Mwutan Nzige, discovered by Baker and called by him the Albert Nyanza. He explored the river in a boat from Urondogani, where Speke left it, and as he proceeded northward, entered a large lake or basin, twenty or twenty-five miles wide, where he was beset by storms, and after two days found his way out again into the river, and followed it far enough to verify that it is the stream that enters the Mwutan Nzige. He thought this lake or basin was not merely a reservoir of the Victoria Nyanza, but was supplied by a great watershed southward of it. It may possibly prove to be Lake Baringo, which is placed vaguely upon the maps upon native information. Col. Long is said to be the first white man who has been upon the Victoria Nyanza. It appeared to him to be from twelve to fifteen miles across, but he says it may be double that breadth. He found it to be from twenty-five to thirty feet in depth. He did not extend his exploration, however, very far, being attacked by a hostile chief in canoes, whom he succeeded in putting to flight after a very severe battle in which a large number of the savages were killed. With the details of his explorations he has sent us a very full account of the country, its products, people and rulers, which

will be published by the Society. Col. Long is an American and served with distinction in the United States army in the late war.

Dr. Nachtigall, to whose journey to Bornou I have previously referred, has returned after an exploration of five years, which has embraced the country east of the Caravan route from Murzuk to Kuka; that to the north and north-east of Lake Tsad; Bornou and then Wadai, Darfour and Kordofan, the region lying between Bornou and the Nile in upper Egypt. This long exploration of five years was prosecuted by Dr. Nachtigall with very limited means, in constant peril of his life and under great trials and hardships; at one time with his camels dead, his horse worn to a skeleton, and his sufferings aggravated by the preaching of a fanatic Missionary that the murder of a Christian was a passport to heaven; at another, traversing a district covered by malaria brought on by the overflow of Lake Tsad, which proved fatal alike to Arabs, Negroes, and to animals, the ravages among the latter of which during three years may be inferred from what he states, that one proprietor who had thirty-one thousand head of cattle lost all but three hundred. He visited Abeshir, the capital of Wadai, and was well received by Sultan Ali, who he pronounces the most sensible ruler in Central Africa. He found Wadai inferior to Bornou in natural wealth and civilization, and says that the curse of the countries he traversed is the internal slave trade. He saw a caravan of a thousand of these unhappy wretches chained, whilst they were driven to the distant market of Kuka, the drivers mercilessly cutting the throats of those who were even under the lash unable, from exhaustion, to continue their terrible march. Every friend of humanity will rejoice in the efforts of the Khedive of Egypt to suppress this traffic so far as it finds an outlet in his dominions. Colonel Gordon, under his direction, is now efficiently following up what was begun by Sir Samuel Baker. Darfour, the region north of the Lybian desert, is a great center and highway for this trade. The King of Darfour toward the close of the year, with an army of ten thousand men, invaded the Egyptian territory upon a slave-hunting expedition; the Egyptian governor, Zebia Bey, collected his forces, marched against the invader, defeated him in a battle which lasted six hours, and Darfour is now annexed to the Egyptian dominions.

The expedition of Rholf's for the exploration of the Lybian desert has returned. It was found to be the most sterile part of the Sahara, and that the permanent occupation of the Oasis is impossible. It is the dried-up basin of a shallow sea, below the level of the Mediterranean, the present surface of which was found to be a dry chalk plateau like the Swabian Alps.

The Rabbi Mardokhai Ben Abi Serour, a Jewish gentleman born in the Sahara, gave an account during the year, to the French Geographical Society, of various journeys made by him in Africa; among others a journey made to Timbuctoo, where he passed fourteen years, no Jew having before been admitted. A French expedition is now making preliminary investigations, as to the feasibility of M. Lesseps' project, for creating an inland sea to the south of Tunis. The project is warmly opposed by some who are familiar with this part of Africa, upon the ground that it is not only useless, but would have an injurious effect upon the climate of the south of Europe, and would also destroy the great source of wealth in this part of Africa, the cultivation of the date tree. Dr. Cassins says that the existing commerce can be sufficiently carried on by caravans, and that the commercial results of the undertaking would never justify the enormous expenditure, which is estimated at £24,000,000 sterling.

The explorations along the western coast of Africa have been unusually active. The Marquis de Compeigne and M. Marche have returned from their exploration of the river Ogowe in west equatorial Africa, which was not fully accomplished, as they were compelled, by war, and the receding waters, to return, but much was learned respecting the river, and the region which it drains. Dr. Güssfeldt made a journey up the Quilla river, and found a country reminding him of Switzerland. He returned to join an expedition which is to cross the Equator, and penetrate easterly to Monbutta country, explored by Dr. Schweinfurth. The Abbe Bouche has made a journey through part of Dahomey, and collected a mass of information respecting it, which he has laid before the French Geographical Society. Lieut. Gandy, the commander of the West coast expedition for the relief of Dr. Livingstone, has returned, and laid before the Royal Geographical Society an interesting account of the region he traversed. He found the natives civilized but indolent, that roads were being made to intercept the transit of slaves to the coast, and that attention was given to the cultivation of the India rubber tree, of the value of which the natives were previously ignorant. A terrible epidemic, the small-pox, was decimating Congo as he passed through it, and he describes the Congo as one of the grandest rivers in the world, and as navigable for one hundred and ten miles from its mouth. On the east coast Mr. Stanley has organized an expedition from Zanzibar, which is to be prosecuted at the joint expense of the New York *Herald* and the London *Telegraph* — for the purpose of exploring the region last visited by Dr. Livingstone; and M. de Brazza is to explore in the same direction, the expense of which is

to be borne by the French Marine and the Geographical Society of Paris.

AUSTRALASIA.

The last general field of exploration has been among the great groups of islands in the middle and south Pacific, which we now embrace under the general term of Australasia. I shall begin with one of the northerly members of this great archipelago.

GEORGE PSALMANAZAR.

In the year 1702 a young man appeared in London, calling himself George Psalmanazar, a native of the island of Formosa converted to Christianity, who created the greatest interest by living exclusively upon raw meat, roots and herbs, and by the account he gave of Formosa, its people, government and history. The Bishop of London became his patron, many of the nobility and clergy interested themselves warmly about him, and as some persons doubted his story, he, to substantiate it, published a work in 1704, now a literary curiosity, in which he gave an elaborate account of the island, its geography, history, form of government, language, religion, and the manners and customs of its people, with an account also of his travels and conversion to Christianity, which was profusely illustrated with engravings of temples, altars for the worship of the sun and moon, portraits of the king, queen and viceroy, their palaces, figures of different classes of the people, the coins in use, the idols that were in the temples, the characters of the national alphabet, and a map of the island, the publication of which intensified the interest respecting him, so that the work rapidly passed to a second edition, but some statements in which ultimately led to the discovery that the whole was a fabrication, that he never could have been in Formosa, and that he was one of the most ingenious and successful of impostors.

Although he was but nineteen years of age, he had invented a language which he both wrote and spoke, and of the grammar of which he gave an account. He translated the catechism into this imaginary tongue, which performance was examined by the learned, who saw in it, or thought they did, a real language, having regular grammatical forms, and which they declared was wholly unknown. As has happened in other clever literary impostures, none are so unforgiving as those who have been thus deceived, and Psalmanazar, notwithstanding the extraordinary ability he displayed, sunk into obscurity for the remainder of his life in London, where he continued to live, eking out a bare subsistence by literary drudgery, and

where he died at the advanced age of eighty-three. This seclusion was in part self-sought, for no man was ever more sincerely repentant; no one regarded his past imposture with more disgust and abhorrence than he did himself, and he afterward became sincerely religious, humble-minded, and most exemplary in his life. Such is the testimony of Dr. Johnson, who knew him well, and frequently met him for the pleasure and instruction of conversing with him, and who, when asked by Mrs. Piozzi to tell her who was the best man he had ever known, immediately answered, George Psalmanazar. Shortly before his death he wrote an account of his early life, but concealed his real name, and the place of his birth, for the reason, as he said, that he belonged to an ancient but decayed family, which he did not wish to connect with his imposture. It has been conjectured that he was born in France, and probably in the province of Gascony. Of the island of Formosa he knew little more than the name, which was about as much as was then generally known respecting it in Europe, and the fabric he wove, beyond what was invention, was made up of such scraps of information about the far East as he had gathered from Jesuit missionaries, at whose seminary he was at school when a boy.

FORMOSA.

Notwithstanding the attention that was drawn to Formosa by this incident, very little until recently was known about the island, though it is only eighty miles from the eastern coast of China, except that the Dutch had established settlements and factories there as early as 1624; that the Chinese afterward colonized the western part, driving the natives gradually to the interior; and that the Dutch were expelled by the Chinese in 1664. Of the interior, especially of the eastern part, our information has been heretofore exceedingly scanty, and much that has recently been obtained is due to the Protestant and Roman Catholic missionaries, to General C. W. LeGendre, the United States Consul at Amoy and Formosa, and Prof. J. B. Steere, of the Michigan University, at Ann Arbor, who sent us last June an exceedingly interesting account of his explorations over the island, during a period of seven months, containing new and valuable information, accompanied by eight vocabularies of the language, as spoken by different tribes, written scores of the native music, photographs of the scenery and the Aborigines, a map of the island, made by Gen. LeGendre in 1870, and some old native manuscripts in the Roman character, dating as far back as 1723, sixty years after the expulsion of the Dutch.

Prof. Steere made large collections in natural history, for the University of Michigan, many of which are entirely new, and intended, during his stay, to study the native languages. He was unable during his journey to fix the position of places, having nothing with him but a pocket compass to indicate the direction, and for the distance between places, he had to rely upon native information and his own fatigue. The Aborigines, he says, are evidently allied to the Polynesian races, and he divides them into two great divisions: 1. The ancient inhabitants of the plains, who are scattered over the entire length of the island, and driven out by the Chinese from the cultivated part, and who are called by the Chinese *Pepo-hoans* (barbarians), and those in the center of the island, *Sik-hoans* (cultivated barbarians). 2. The wild and savage Aborigines who inhabit the steep, rocky mountains at the east, who occupy about half of the island, and although they consist of many tribes, are known by the general name of *Che-hoans* (unripe barbarians). The old manuscript referred to, he found among the *Pepo-hoans*, which being in our own letters, he thinks is owing to the former Dutch occupation, when the people, he supposes, were taught by the Dutch missionaries to write their own language in Roman characters, as has been done with our own Indians, and of which from the dates, the natives appear to have retained the knowledge for at least 150 years after the expulsion of the Dutch. The *Pepo-hoans* he found very poor, their lands being mortgaged to the Chinese. He describes them as honest, hospitable and kindly, differing from the Chinese in a natural love and taste for music. The children were bright and intelligent, and he noticed as a curious custom, that they are named after trees.

The second division, or the savages, the *Che-hoans*, are a small and inferior-looking race, averaging about five feet, but are very muscular from constant climbing in their steep mountains. He found that they were flat-footed, the arch of the foot being entirely wanting, the large toe turned toward the heel, and the feet as hard as horn, so that the sharp rocks do not penetrate them. Both men and women are tattooed. They are also a very musical people. Some little girls sang at his door all night. He saw a large number of men and women collected in the house of the chief, when the women sang a monotonous and musical chant, to which the men would reply. He says that the number of the savages it is difficult to estimate, but that they are more numerous than might be inferred from the rocky country they inhabit. Unlike mountain dwellers generally, they are not brave, and being badly armed, seek safety in the woods and rocks, through which they pass with the facility of wild animals.

Those who inhabit the sea-coast are a finer race, better armed, and plunder wrecked vessels. They cut off, dry and keep the heads of their enemies, for a trophy, as our Indian does with the scalp. Mr. S. saw twenty-four of these dried heads in one place, apparently belonging to one man. He found no evidence of their being cannibals, although they are reported to be so. They have no religious system, but are greatly troubled by superstitious fears in connection with natural sights and sounds. Among the *Kale-hoans*, one of the savage tribes, he found the women, whether at work in the fields or in the villages, had their heads always covered with wreaths of vines or flowers.

Although the Chinese are constantly encroaching upon the Aborigines, it would, he thinks, at the present rate, take centuries for them to gain possession of the mountainous parts, even if they could ever conquer the whole island. In the north end of the island, coal is found in great abundance. There is evidence there, of volcanic disturbances; sulphur is deposited in great quantities, and there are large, boiling mineral springs, and jets of steam issuing from the earth. The soil and climate of the island are particularly well adapted for the growth of the tea plant, the cultivation of which has been begun, and in one place has attained considerable importance. The island has long been resorted to for camphor, which may soon be exhausted, for the tree has to be destroyed to obtain the valuable drug, and it is not, he says, replanted.

Mr. E. S. Ravenstein, who has compiled, and recently published in the *Geographical Magazine*, a large body of facts respecting Formosa, thinks that the estimate of the population, three millions, is too large, and that it does not exceed a million and a half; but Prof. Steere gives three millions as the general estimate of the Chinese population alone, and, having had opportunities for personal observations, thinks even that to be an under estimate. Formosa, though only occupied by the Chinese for about two centuries, has seven walled cities. The wall of Taiwan-fu, the nominal capital, Prof. Steere says, is 25 feet in height as well as in breadth, and that it is said to be seven miles in circumference; the population within the wall he estimates at between thirty and sixty thousand. The Chinese population in Formosa, he says, are very turbulent, and that a revolution occurs about every ten years. Mr. S. also went over the Pescadore islands, a group lying between Formosa and China, but I have already exhausted my limits, by drafts from his very interesting paper.

NEW GUINEA.

I gave an extended account in my last address of the exploration and survey of H. M. S. Basilisk, commanded by Capt. Morsby, R. N., upon the east coast of New Guinea and the shores and islands in Torres Strait, and the very interesting description of the savage inhabitants of these hitherto unvisited regions. Their general character, their propensity to cannibalism, and their mode of life in houses erected upon poles. The Basilisk returned to England last autumn, after having been nearly four years in commission, during which twelve hundred miles of coast line was surveyed, and twelve first-class harbors, several navigable rivers, and more than one hundred islands, large and small, have been added to the charts. Some of the islands, unknown before the exploration of the Basilisk, are large and densely populated, exceedingly fertile, and intersected by navigable rivers. Some of the work done was performed in open boats detached from the ship, in some instances for many weeks, among savages who had never before seen the face of a white man. Two lofty mountains, about eleven thousand feet high, on the north-east coast of New Guinea, were named respectively Mount Gladstone and Mount Disraeli, the two rival peaks, very appropriately for the names they bear, being so placed as to face each other.

Dr. Beccarie, to whose previous explorations I have referred, when last heard from, had succeeded in reaching Makassar, which he intended to leave for Kendari, an unexplored region of the Celebes, and from whence he expects to proceed to New Guinea or Sumatra. He states that at Celebes, in the Moluccas and in the Aroe islands, there is a general belief in the existence of an enormous cuttle fish, which drags down boats with its giant arms and suckers, and which, in the Aroe islands, is known by the name of the Varcola. An expedition to the eastern coast of Sumatra is about to be dispatched by the Dutch Geographical Society.

AUSTRALASIA.

Col. P. F. Warburton has made a remarkable journey across Australia, from Adelaide to the west coast, which was achieved under extraordinary difficulties. After the first two hundred miles, the whole region traversed was a dreary, and scarcely habitable, waste, the country, with but few exceptional places, consisting of ridges of sand with intervening flats, which are without water and uninhabitable. The natives found are the very lowest in the scale of humanity. They had no huts nor place of shelter, except the

shady side of a bush. As to clothing, the men put a bone of the Walabee, a small animal that lives without water, through their noses, and are then, he says, in full dress; and as respects the dress of the women, he adds, there is nothing to say. The natives avoided the explorers, and were difficult to find. An attempt was made to catch and keep one without water, that he might thereby be compelled to point out where water was to be found. They succeeded in catching a girl, and to secure her, tied her fast to a tree, but she gnawed through the rope and escaped, running on tiptoe to prevent the explorers from discovering her trail.

Mr. John Forrest crossed Australia from the western coast through an unexplored country for two thousand miles along the 26th parallel of south latitude, in a journey of five months, much of the territory being of the poorest description.

The north-east exploration expedition from Queenstown, under Mr. D. C. Dalrymple, between $15^{\circ} 15''$ and $18^{\circ} 15''$ south latitude, ascended the range of the Belendin Kerr mountains, which are twenty-five miles in length, and were found to be of granite; new rivers were discovered and a country covered with jungle, the soil of which is suitable for the cultivation of sugar and other tropical products; this important newly-discovered land, being estimated at about half a million of acres.

In 1848 Ludwig Leichardt, a German traveler, went out at the head of an expedition for the exploration of Central Australia, and nothing more was heard of him or of his companions. In 1872, twenty-four years afterward, the government of Sydney sent out Andrew Hume to search for Leichardt. Last February, Hume returned with the information that he had found Clossen, Leichardt's fellow traveler, living among a tribe of bushmen, and that Clossen informed him that while he had gone off in pursuit of water, a mutiny broke out among Leichardt's followers, who stripped him of his tents, horses, and equipment, and set off in a north-westerly direction, leaving him to perish; that Leichardt died; and that the mutineers were eventually slain by the natives in attempting to reach the populated part of South Australia. Hume brought home Leichardt's quadrant, watch, and seventy pages of his notes; but Clossen, who had grown very weak and aged, refused to leave the bushmen.

A census of the Island of Ceylon has for the first time been taken, and found to be 2,500,000; and in the course of the year the Fejee islands, said to be 312 in number, and covering an area of 8,034 square miles, have been annexed to the kingdom of Great Britain.

After this review of the geographical work of the world in a single

year, I may, in conclusion, remark that although geographical inquiry began with the dawn of civilization, its progress has been necessarily slow ; that although much is now known, much yet remains to be known, from which a conception may be formed of the vastness of the inquiry, of the obstacles which obstruct it, and of the infinite details it involves. The Creator, who has placed us upon this planet, has endowed us with faculties by which we can learn every thing respecting it, and the lesson taught by the past is, that, as that knowledge has increased, mankind has advanced in the scale of being. The same influences which have heretofore raised him from the savage state, which have converted the wilderness into a cultivated field, and brought about commercial intercourse, and the interchange of knowledge between people widely separated, still exist, and have yet a large field for their exercise in various parts of the globe. To the lonely traveler, and self-sacrificing missionary, it is a support and an encouragement to know that there are thirty-five geographical societies in the world, who watch their progress, estimate their labor at its value, and welcome each addition they make to the stock of human knowledge. The world is now fully awake to the importance of this work, and pervaded by the sentiment that there are no people too remote or too degraded to feel the influence and benefit by the results of geographical inquiry.